Schematic of washing machine controller:

Microcontroller

Operation Controller

Timer

**Mode of operations**

1. Wash (with heated water) -> Rinse -> Dry
2. Wash (with heated water) -> Rinse
3. Rinse -> Dry
4. Wash (without heated water) ->Rinse -> Dry
5. Wash (without heated water) -> Rinse
6. Dry

1

6

5

4

3

2

Motor

Water in-let

Door close

Heater

**Input, output and wires of top-level module (microcontroller)**

|  |  |  |
| --- | --- | --- |
| **Microcontroller** | | |
| **Inputs** | **Wires** | **Outputs** |
| Clock | Start | State |
| Input1 | Ready |  |
| Input2 | Fill\_water\_operation |  |
| Input3 | Heat\_water\_operation |  |
| Input4 | Wash\_operation |  |
| Input5 | Rinse\_operation |  |
| Input6 | Spin\_operation |  |
| Sig\_cancel | Fault |  |
| Sig\_time\_out | Coin\_return |  |
| Sig\_out\_of\_balance | Water\_intake |  |
| Sig\_motor\_failure | Fault\_cleared |  |
|  | Sig\_full |  |
|  | Sig\_temperature |  |
|  | Sig\_wash\_completed |  |
|  | Sig\_rinse\_completed |  |
|  | Sig\_spin\_completed |  |

**Input output and parameters of leaf modules (controller and timer):**

|  |  |  |
| --- | --- | --- |
| **Controller** | | |
| **Inputs** | **Parameters** | **Outputs** |
| Clock | State\_start = 000 | Start |
| Input1 | State\_ready = 111 | Ready |
| Input2 | State\_fill\_water = 222 | Fill\_water\_operation |
| Input3 | State\_heat\_water = 333 | Heat\_water\_operation |
| Input4 | State\_wash = 444 | Wash\_operation |
| Input5 | State\_rinse = 555 | Rinse\_operation |
| Input6 | State\_spin = 666 | Spin\_operation |
| Sig\_cancel | State\_fault = 777 | Fault |
| Sig\_time\_out |  | Coin\_return |
| Sig\_out\_of\_balance |  | Water\_intake |
| Sig\_motor\_failure |  | Fault\_cleared |
| Sig\_full |  | State |
| Sig\_temperature |  |  |
| Sig\_wash\_completed |  |  |
| Sig\_rinse\_completed |  |  |
| Sig\_spin\_completed |  |  |

|  |  |  |
| --- | --- | --- |
| **Timer** | | |
| **Inputs** | **Parameters** | **Outputs** |
| Clock | State\_start = 000 | Sig\_full |
| State | State\_ready = 111 | Sig\_temperature |
|  | State\_fill\_water = 222 | Sig\_wash\_completed |
|  | State\_heat\_water = 333 | Sig\_rinse\_completed |
|  | State\_wash = 444 | Sig\_spin\_completed |
|  | State\_rinse = 555 |  |
|  | State\_spin = 666 |  |
|  | State\_fault = 777 |  |
|  | Full\_water\_time = 22 |  |
|  | Required\_temperature\_time=33 |  |
|  | Wash\_time = 555 |  |
|  | Rinse\_time = 33 |  |
|  | Spin\_time = 33 |  |